DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 4, 11, 18, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Sariel et al. (WO00/72267 – Note: The paragraphs and figures of published US 7194139 of the PCT document are being referenced in the comments below.).

Instant claim 1: A sensing apparatus, comprising:

sensor array comprising at least a first sensor and a second sensor, [*Sariel has disclosed a system and apparatus for optical compression, and has taught in column 10 lines 55-60 and column 25 lines 25-25 has taught at least a first and second spatial sensor array.*]

the sensor array having associated therewith a spatial coordinate system, [*It is an inherent property of a sensor array that a spatial coordinate is defined based on the set of pixels, else the position of the pixels when read by the system would be unknown.*]

the first sensor having a first sensor location, the second sensor having a second sensor location, [*Each sensor must inherently have a predetermined location in order to be positioned to collect the projected image data.*]

the first sensor location being proximate to a location of a first extremum of at least one basis function of a domain transform, [*Sariel has taught the transformation of the image data to

the Fourier domain in figure 4A and column 13 lines 60+, and has further taught that this transformed image data is gathered by each sensor of the array of sensors. Furthermore, it is inherent that any set of values that is not empty has at least one value that is an extremum. Therefore, there is inherently at least one extremum value gathered at some location on the sensor array taught by Sariel.]

the at least one basis function having at least one spatial coordinate defined according to the spatial coordinate system, [*As per above, the optically transformed (coefficients of the basis function) image is recorded on the sensor arrays, and inherently the spatial coordinates of these coefficient values have a predetermined spatial position on the sensor array. If the coefficients did not have a known position on the array then the values would not be mapped to the proper basis functions (frequency components), and then could not be utilized to reconstruct the image data from the transformed data (DCT coefficients recorded by the sensor arrays).*]

the second sensor location being proximate to a location of a second extremum of the at least one basis function; and [*See above, wherein the same remains true for each sensor array.*]

at least one filter [*The filter is being interpreted as a device that processes data.*] coupled to receive a signal from the first sensor, the at least one filter being further coupled to receive a signal from the second sensor, [*Column 25 lines 5-25 and figure 7B of Sariel disclosed a combiner (filter) for summing the data (Y, U, and V components) from the various sensors.*]

the at least one filter being configured to generate a first filter output signal, [*See above, wherein the output is the Y, U, and V components combined.*]

the first filter output signal comprising a weighted sum of at least the signal from the first sensor and the signal from the second sensor. [*See above (weight is one).*]

Instant claim 2: A sensing apparatus according to claim 1, wherein the domain transform comprises at least one of a Fourier transform and a cosine transform. [*Column 10 line 40 disclosed that the transform is the DCT (discrete cosine transform).*]

Instant claim 11: A sensing apparatus according to claim 1, wherein the at least one filter comprises a digital filter. [*As disclosed in column 25 and figure 7B, the combiner (item 226) combines the digital output of the CCD devices, and thus implicitly is a digital filter (although not explicitly stated in the disclosure).*]

Instant claims 18 and 24 describe the method performed by the digital system of claim 1. As per the discussion of claim 1 the system and method have been described by Sariel.

3. Claims 12 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Yano (US 20010/0052935).

Instant claim 12: A sensing apparatus, comprising:

a sensor array comprising a plurality of sensors, the plurality of sensors including at least a first sensor and a second sensor, the sensor array having associated therewith a spatial coordinate system, the first sensor having a first sensor location, the second sensor having a second sensor location, the sensor array being coupled to receive an incoming signal, the incoming signal having a first incoming signal value at the first sensor location, the incoming

signal having a second incoming signal value at the second sensor location; and [*Yano has taught in figure 1, figure 10, paragraph 0029, and paragraph 0041 the capture of two image signals on a sensor array that is divided into two image sensing regions.*]

an interpolation circuit coupled to receive a signal from the first sensor, [*Yano has taught in paragraphs 0048-0051 and 0059-0068 the determination and interpolation of depth values based on the shift amounts between corresponding and "not" corresponding pixels of the left and right stereo images.*]

the interpolation circuit being further coupled to receive a signal from the second sensor, [*See above.*]

the signal from the first sensor representing the first incoming signal value, [*See above.*]

the signal from the second sensor representing the second incoming signal value, [*See above.*]

the interpolation circuit being configured to interpolate the signal from the first sensor and the signal from the second sensor for generating a first interpolated signal, [*See above.*]

the first interpolated signal representing an approximate value of the incoming signal at a location proximate to a first extremum of at least one basis function of a domain transform, the at least one basis function having at least one spatial coordinate defined according to the spatial coordinate system. [*A transformation (inherently has a basis function) of the spatial pixel values to corresponding depth values is performed in the sections outlined above, and inherently has at least one extremum (a set of real numbers has at least one extremum) at some location within the map.*]

Instant claim 25 describes the method performed by the digital system of claim 12. As per the discussion of claim 12 the system and method have been described by Yano.

Allowable Subject Matter

4. Claims 3, 5-10, 13-17, 19-23, and 26-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter: The cited prior art Sariel has taught the optical transformation (compression) of the incoming image signal and the measurement of the signal by three separate color imaging planes (color filtering array), and the recombination of these signals to produce transformed (compressed) color image data. Yano has taught the stereoscopic capture of two images at two image sensors (a single image sensor divided into separate portions), and the interpolation of the signals captured at the sensors. However, neither of these references have taught the analysis of distances between reference points in the sensory array using Farey Fractions (claims 3-9), Mobius Functions (claims 3-9) , more than three sensors (claims 4-9 and 19-22), the interpolation of an Fourier or DCT transformed signal (claims 13 and 26), the amplification and integration of the output signals (claims 10 and 23, Sariel has taught the a weighted combination, but not an integration), and the interpolation and summing of multiple signals (claims 14-17 and 26-30). Additionally, the prior art cited below in the "Conclusion" section has taught various aspects of the implementation of Mobius Functions, Arithmetic Fourier Transforms, and on-

sensor compression that are related to Applicant's actual invention, but do not teach using a set of sensors to capture transformed (Fourier or Cosine Transform) image data.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Zhao et al., "A New Approach of 2-D Discrete Cosine Transform with Mobius Inverse Formula", IEEE, International Conference on Signal Processing Aug 2002, pgs 162-165 Vol. 1
- Kawahito et al., "A Compressed Digital Output CMOS Image Sensor with Analog 2-D DCT Processors and ADC/Quantizer", IEEE Int'l Solid-State Circuits Conf. Digest of Tech. Papers, Feb. 1997, pp.184-185
- Wigley and Jullien, "On Implementing the Arithmetic Fourier Transform"
- XianChao et al, "A New Approach for Implementing the Arithmetic Fourier Transform"

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Bloom whose telephone number is 571-272-9321. The examiner can normally be reached on Monday through Friday from 8:30 am to 5:00 pm (EST). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta, can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Bhavesh M Mehta/

Supervisory Patent Examiner, Art Unit 2624